

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the application of: USUI, Kaoru, et al.

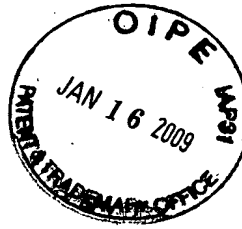
Filed: February 10, 2005

Serial Number: 10/524,211

Group Art Unit: 1794

Examiner: Callie E. Shosho

For: HEAT-GENERATING BODY



DECLARATION UNDER 37 CFR 1.132

Commissioner for Patents

Washington, D.C. 20231

Sir:

I, Hisao KIMURA, do hereby declare as follows:

That I am a citizen of Japan, residing at c/o Mycoal Co., Ltd., 388, Minagawajounai-cho, Tochigi-shi, Tochigi 328-0067 Japan.

I graduated from Kanto Gakuin University, Graduates School of Engineering and majored in chemical technology at the University.

I am an engineer of Mycoal Co., Ltd., and have worked since April 1, 1994. The corporation manufactures heat-generating compositions and heaters using the heat-generating compositions.

I am fully familiar with the invention described in the application.

I measured the critical moisture values of the adhesives disclosed by Munro (US 2002/0037270 A1) as the formulation in EXAMPLE 3, the formulation in EXAMPLE 4, the formulations 5a,5b and 5d in EXAMPLE 5, the formulations 6b,6d,6e and 6f in EXAMPLE 6, the formulation in EXAMPLE 7, the formulation in EXAMPLE 8, the formulation in EXAMPLE 9 and the formulations 10a,10b,10c,10d,10e,10f and 10g in EXAMPLE 10. The critical moisture values are as follows.

EXAMPLE 3	68
EXAMPLE 4	74
5a in EXAMPLE 5	71
5b in EXAMPLE 5	68
5d in EXAMPLE 5	73
6b in EXAMPLE 6	68
6d in EXAMPLE 6	77
6e in EXAMPLE 6	73
6f in EXAMPLE 6	79
EXAMPLE 7	78
EXAMPLE 8	70
EXAMPLE 9	67
10a in EXAMPLE 10	75
10b in EXAMPLE 10	69
10c in EXAMPLE 10	76
10d in EXAMPLE 10	68
10e in EXAMPLE 10	72
10f in EXAMPLE 10	75
10g in EXAMPLE 10	76

I also measured the critical moisture values of the heat generating agents disclosed by USUI (US 5,046,479) as the formulations in EXAMPLE 1 and

EXAMPLE3. The critical moisture values are as follows.

EXAMPLE 1 88

EXAMPLE 3 94

Signed this 16th day of January, 2009

Hisao KIMURA

Hisao KIMURA

Residence: Tochigi Japan

Post Office Address: c/o Mycoal Co., Ltd., 388, Minagawa Jounai-cho,
Tochigi-shi, Tochigi 328-0067 Japan

Measuring Object : Formulation 3 disclosed by Munro (US2002/0037270A1) as EXAMPLE 3

Weight \ Relative Humidity	50%	60%	70%	80%
Premeasurement	7.7g	7.7g	7.7g	7.7g
Postmeasurement	6.7g	7.3g	7.8g	9.8g
Changed Weight	-1.0g	-0.4g	0.1g	1.3g

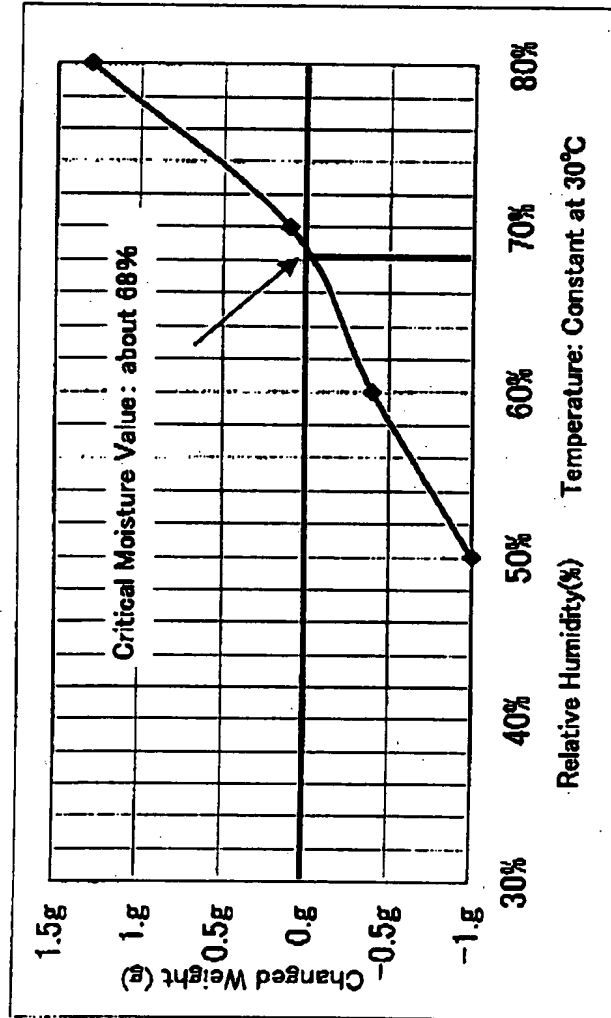
Composition in parts by weight	
Formulation	Weight (g)
58%NaAMPS	57
KCl	5
58%SPA	10
Glycerol	30
PI/XL(Solution) Solution A	0.15
Total Weight	102.15

Coating Amount: 1000~1200kg/m²

NaAMPS: 2-acrylamido-2-methylpropane sulphonic acid

SPA: potassium salt of 3-sulphopropyl acrylate

Solution A: In 20 parts of polyethylene glycol diacrylate (molecular weight 600) 6 parts of 1-hydroxy cyclohexyl phenyl ketone were dissolved.



Measuring Object : Formulation 4 disclosed by Munro (US2002/0037270A1) as EXAMPLE 4

Weight\Relative Humidity	50%	60%	70%	80%
Premeasurement	7.7g	7.7g	7.7g	7.7g
Postmeasurement	6.4g	6.8g	7.4g	8.2g
Changed Weight	-1.3g	-0.9g	-0.3g	0.5g

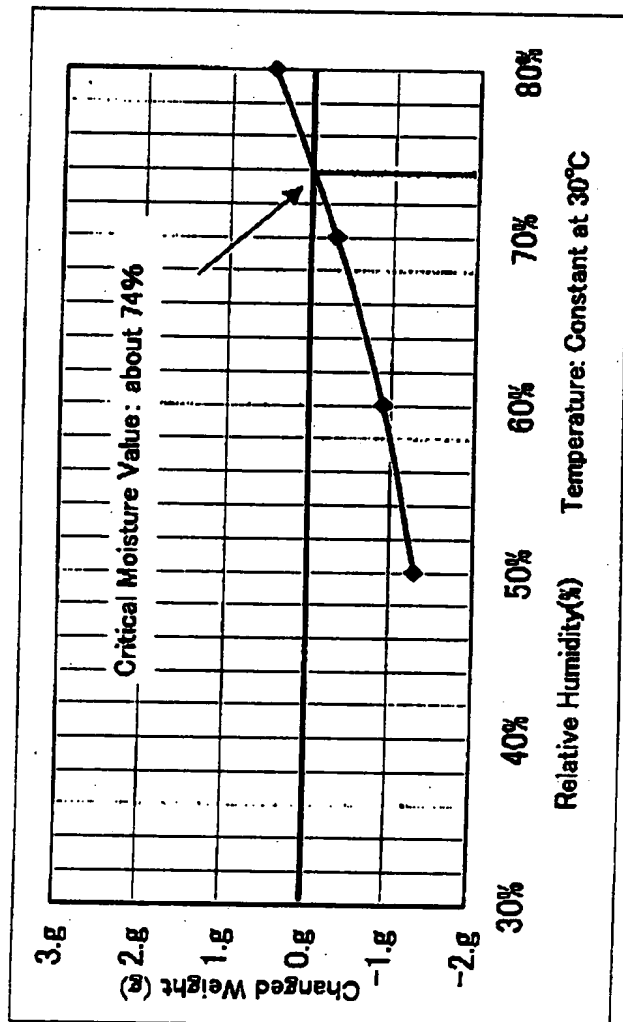
Composition in parts by weight	
Formulation	Weight (g)
58%NaAMPS	57
Citic Acid	1
KCl	5
58%SPA	10
Glycerol	30
PI/XL(Solution) Solution A	0.15
Total Weight	103.15

Coating Amount: 1000~1200kg/m²

NaAMPS: 2-acrylamido-2-methylpropane sulphonic acid

SPA: potassium salt of 3-sulphopropyl acrylate

Solution A: In 20 parts of polyethylene glycol diacrylate (molecular weight 600) 6 parts of 1-hydroxy cyclohexyl phenyl ketone were dissolved.



Data Sheet No. 3/21

Measuring Object: Formulation 5a disclosed by Munro (US2002/0037270A1) as EXAMPLE 5

Weight \ Relative Humidity	50%	60%	70%	80%
Premeasurement	7.7g	7.7g	7.7g	7.7g
Postmeasurement	6.9g	7.2g	7.8g	8.9g
Changed Weight	-0.8g	-0.5g	-0.1g	1.2g

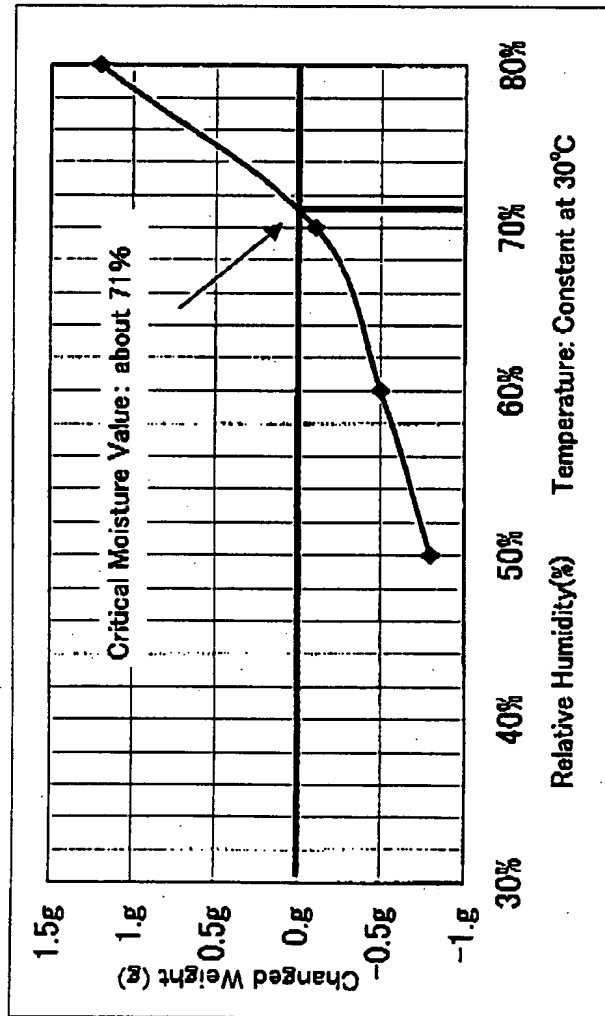
Composition in parts by weight	
Formulation	Weight (g)
50%NaAMPS	58
Acrylic Acid	1.575
SPA	2
Glycerol	37
PI/XL(Solution) Solution F	0.175
Total Weight	98.75

Coating Amount: 1000~1200kg/m²

NaAMPS: 2-acrylamido-2-methylpropane sulphonic acid

SPA: potassium salt of 3-sulphopropyl acrylate

Solution F: In 20 parts of alkoxylated triacrylate 1.4 parts of 1-hydroxy cyclohexyl phenyl keton were dissolved.



Data Sheet No. 4/21

Measuring Object : Formulation 5b disclosed by Munro (US2002/0037270A1) as EXAMPLE 5

Weight \ Relative Humidity	50%	60%	70%	80%
Premeasurement	7.7g	7.7g	7.7g	7.7g
Postmeasurement	7.1g	7.3g	7.8g	8.4g
Changed Weight	-0.6g	-0.4g	0.1g	0.7g

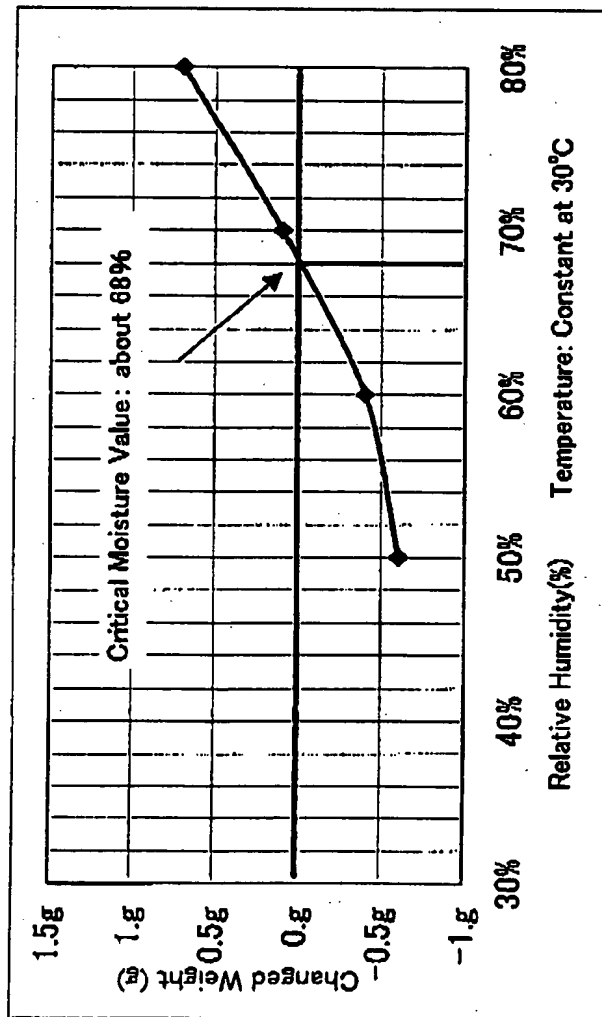
Composition in parts by weight	
Formulation	Weight (g)
50%NaAMPS	58
Acrylic Acid	1.575
SPA	2
Glycerol	37
PI/XL(Solution) Solution F	0.15
Total Weight	98.725

Coating Amount: 1000~1200kg/m²

NaAMPS: 2-acrylamido-2-methylpropane sulphonic acid

SPA: potassium salt of 3-sulphopropyl acrylate

Solution F: In 20 parts of alkoxyated triacrylate 1.4 parts of 1-hydroxy cyclohexyl phenyl keton were dissolved.



Data Sheet No. 5/21

Measuring Object : Formulation 5d disclosed by Munro (US2002/0037270A1) as EXAMPLE 5

Weight \ Relative Humidity	50%	60%	70%	80%
Premeasurement	7.7g	7.7g	7.7g	7.7g
Postmeasurement	6.9g	7.6g	7.5g	8.1g
Changed Weight	-0.8g	-0.7g	-0.2g	0.4g

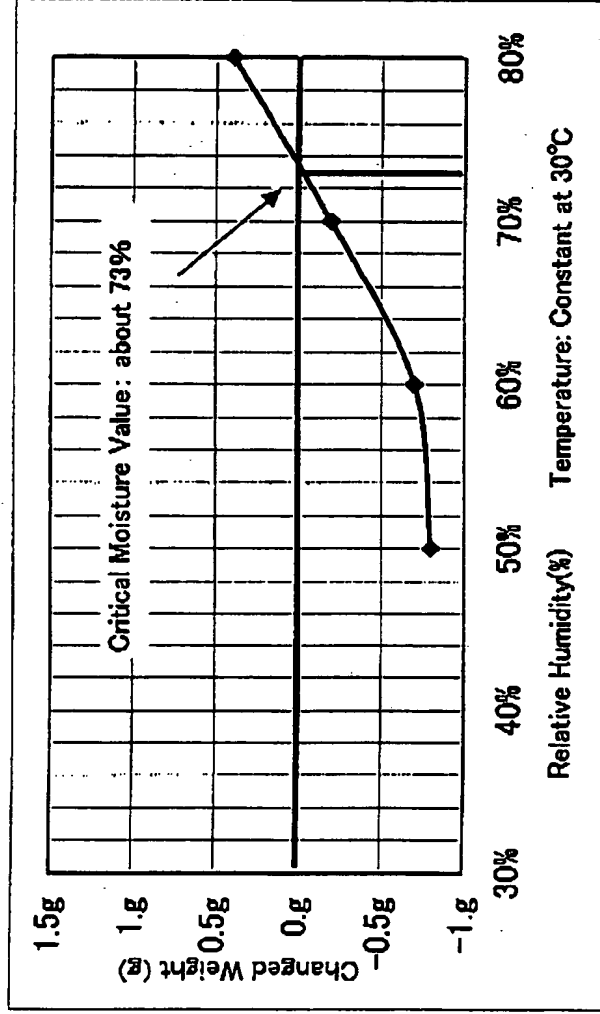
Composition in parts by weight	
Formulation	Weight (g)
50%NaAMPS	75
KCl	5
SPA	2
Glycerol	25
DI WATER	3
PI/XL(Solution) Solution A	0.15
Total Weight	110.15

Coating Amount: 1000~1200kg/m²

NaAMPS: 2-acrylamido-2-methylpropane sulphonic acid

SPA: potassium salt of 3-sulphopropyl acrylate

Solution A: In 20 parts of polyethylene glycol diacrylate (molecular weight 600) 6 parts of 1-hydroxy cyclohexyl phenyl keton were dissolved.

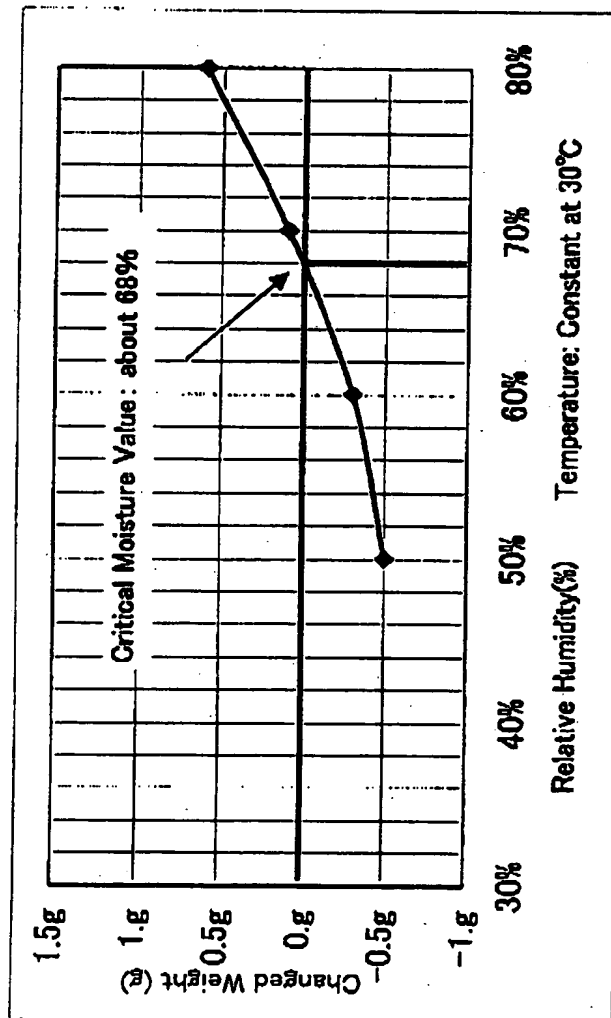


Data Sheet No. 6/21

Measuring Object : Formulation 6b disclosed by Munro (US2002/0037270A1) as EXAMPLE 6

Weight \ Relative Humidity	50%	60%	70%	80%
Premeasurement	7.7g	7.7g	7.7g	7.7g
Postmeasurement	7.2g	7.4g	7.8g	8.3g
Changed Weight	-0.5g	-0.3g	0.1g	0.6g

Composition in parts by weight	
Formulation	Weight (g)
58%NaAMPS	57
SPA	10
Glycerol	33
PI/XL(Solution) Solution G	0.06
Total Weight	100.06



Coating Amount: 1000~1200kg/m²

NaAMPS: 2-acrylamido-2-methylpropane sulphonic acid

SPA: potassium salt of 3-sulphopropyl acrylate

Solution G: In 20 parts of polyethylene glycol diacrylate (molecular weight 400) 6 parts of 1-hydroxy cyclohexyl phenyl ketone were dissolved.

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Measuring Object : Formulation 6d disclosed by Munro (US2002/0037270A1) as EXAMPLE 8

Weight \ Relative Humidity	50%	60%	70%	80%
Premeasurement	7.7g	7.7g	7.7g	7.7g
Postmeasurement	6.4g	6.7g	7.2g	7.9g
Changed Weight	-1.3g	-1.g	-0.5g	0.2g

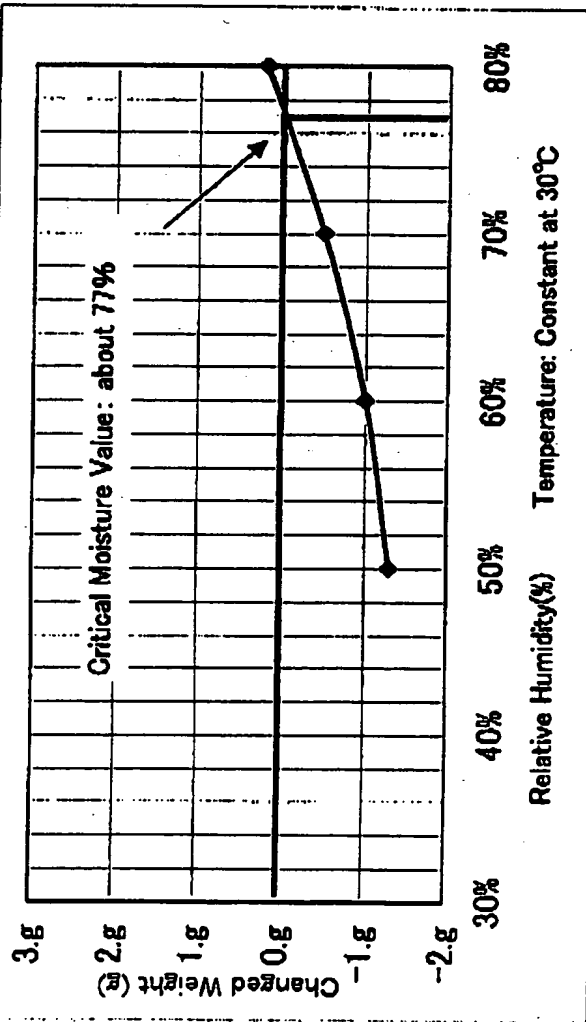
Composition in parts by weight	
Formulation	Weight (g)
58%NaAMPS	57
KCl	5
SPA	10
Glycerol	28
PI/XL(Solution) Solution G	0.075
Total Weight	100.075

Coating Amount: 1000~1200kg/m²

NaAMPS: 2-acrylamido-2-methylpropane sulphonic acid

SPA: potassium salt of 3-sulphopropyl acrylate

Solution G: In 20 parts of polyethylene glycol diacrylate (molecular weight 400) 6 parts of 1-hydroxy cyclohexyl phenyl keton were dissolved.

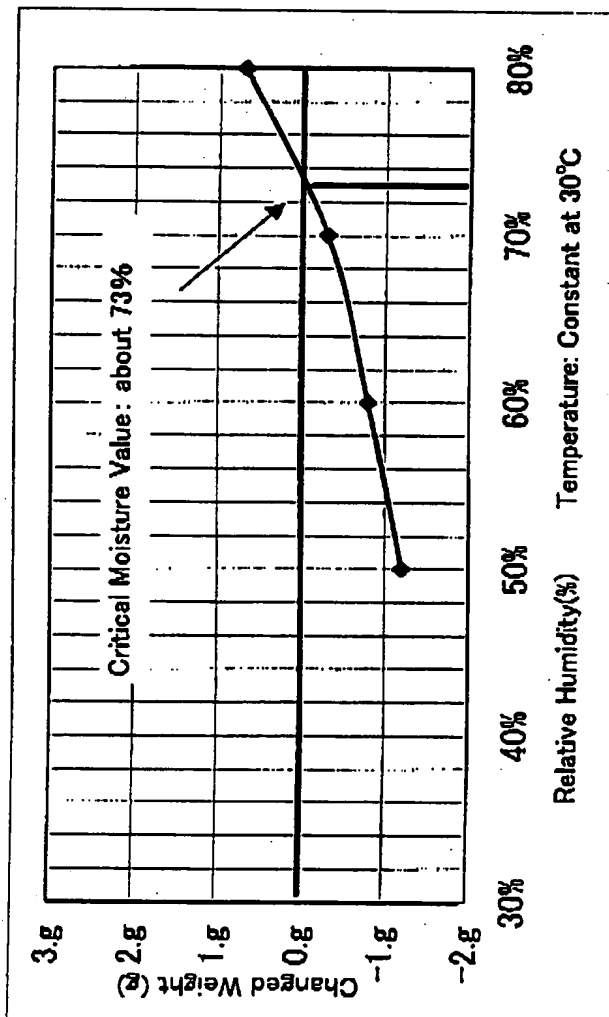


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Measuring Object : Formulation 6e disclosed by Munro (US2002/0037270A1) as EXAMPLE 6

Weight \ Relative Humidity	50%	60%	70%	80%
Premeasurement	7.7g	7.7g	7.7g	7.7g
Postmeasurement	6.5g	6.9g	7.4g	8.4g
Changed Weight	-1.2g	-0.8g	-0.3g	0.7g

Composition in parts by weight	
Formulation	Weight (g)
58%NaAMPS	67
KCl	5
SPA	2
Glycerol	30
Gum Arabic	2
DM137	2
PI/XL(Solution) Solution A	0.25
Total Weight	108.25



Coating Amount: 1000~1200kg/m²

NaAMPS: 2-acrylamido-2-methylpropane sulphonic acid

SPA: potassium salt of 3-sulphopropyl acrylate

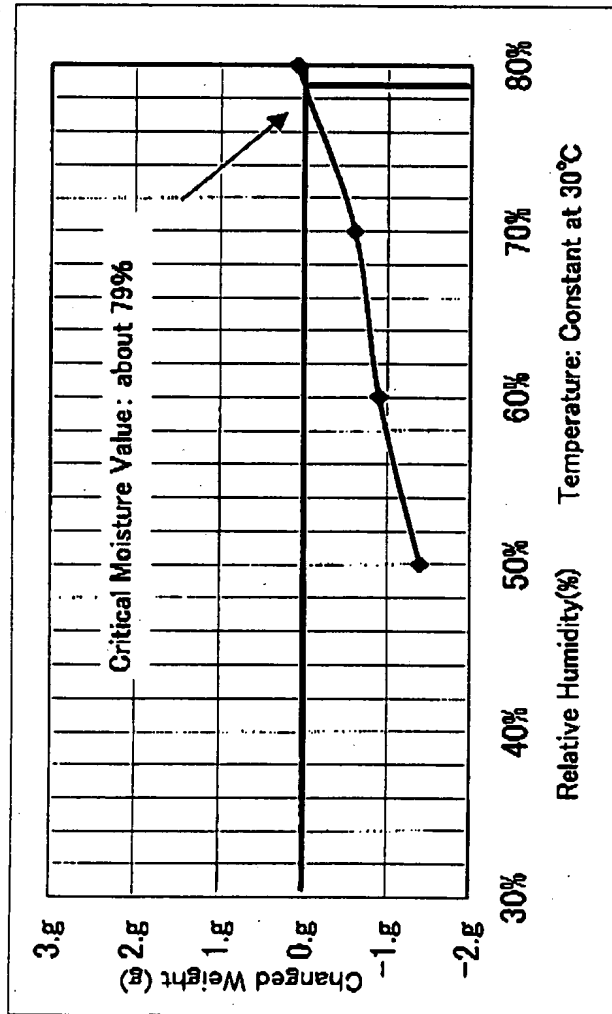
DM137: ethylene/vinyl acetate copolymer

Solution A: In 20 parts of polyethylene glycol diacrylate (molecular weight 500) 6 parts of 1-hydroxy cyclohexyl phenyl keton were dissolved.

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Measuring Object : Formulation 6f disclosed by Munro (US2002/0037270A1) as EXAMPLE 6

Weight \ Relative Humidity	50%	60%	70%	80%
Premeasurement	7.7g	7.7g	7.7g	7.7g
Postmeasurement	6.3g	6.8g	7.1g	7.8g
Changed Weight	-1.4g	-0.9g	-0.6g	0.1g



Composition in parts by weight	
Formulation	Weight (g)
58%NaAMPS	50
KCl	1
Citric Acid	1
SPA	18
Glycerol	20
DM137	3
PEG 400	10
Sodium Nitrate	0.05
PI/XL(Solution) Solution A	0.175
Total Weight	103.225

Coating Amount : 1000~1200kg/m²

NaAMPS: 2-acrylamido-2-methylpropane sulphonic acid

SPA: potassium salt of 3-sulphopropyl acrylate

DM137: ethylene/vinyl acetate copolymer

Solution A: In 20 parts of polyethylene glycol diacrylate (molecular weight 600) 6 parts of 1-hydroxy cyclohexyl phenyl ketone were dissolved.

Measuring Object : Formulation 7 disclosed by Munro (US2002/0037270A1) as EXAMPLE 7

Weight \ Relative Humidity	50%	60%	70%	80%
Premeasurement	7.7g	7.7g	7.7g	7.7g
Postmeasurement	5.4g	5.7g	6.3g	8g
Changed Weight	-2.3g	-2.8g	-1.4g	0.3g

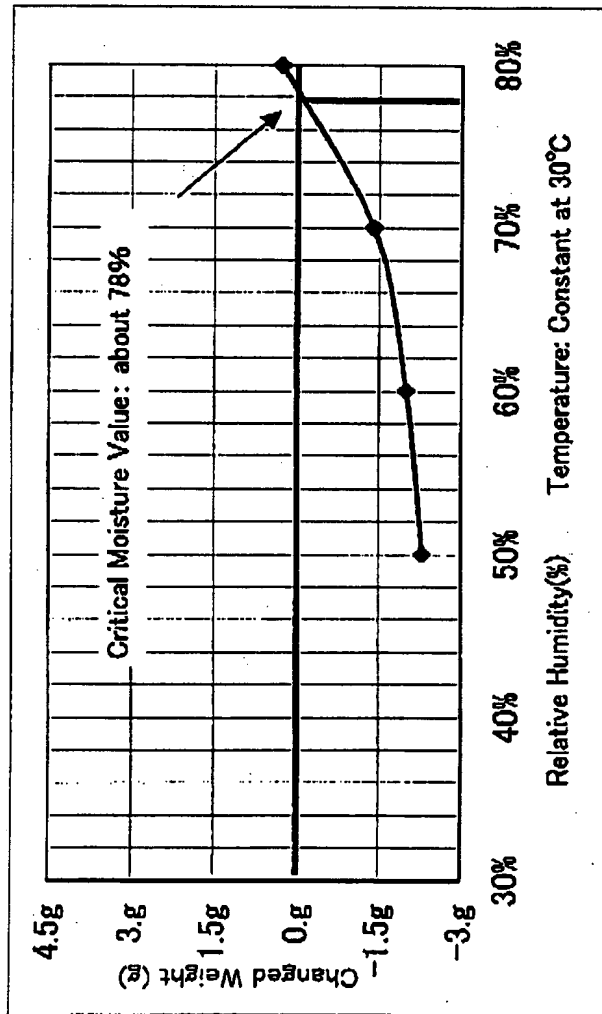
Composition in parts by weight	
Formulation	Weight (g)
58%NaAMPS	34.7
KCl	4.6
Distilled Water	3
58%SPA	34.7
Glycerol	23.2
PI/XL(Solution) Solution A	0.15
Total Weight	100.35

Coating Amount: 1000~1200kg/m²

NaAMPS: 2-acrylamido-2-methylpropane sulphonic acid

SPA: potassium salt of 3-sulphopropyl acrylate

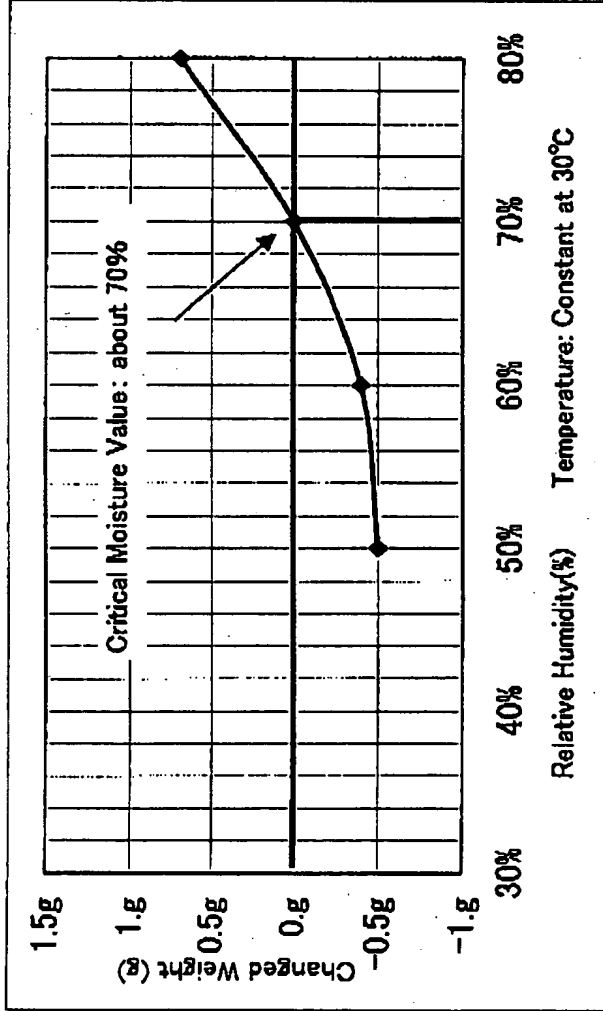
Solution A: In 20 parts of polyethylene glycol diacrylate (molecular weight 600) 6 parts of 1-hydroxy cyclohexyl phenyl keton were dissolved.



Measuring Object : Formulation 8 disclosed by Munro (US2002/0037270A1) as EXAMPLE 8

Weight \ Relative Humidity	50%	60%	70%	80%
Premeasurement	7.7g	7.7g	7.7g	7.7g
Postmeasurement	7.2g	7.3g	7.7g	8.4g
Changed Weight	-0.5g	-0.4g	0.g	0.7g

Composition in parts by weight	
Formulation	Weight (g)
58%NaAMPS	50
KCl	5
SPA	16
Glycerol	20
DM137	3
PEG 600	10
PI/XL(Solution) Solution A	0.13
Total Weight	104.13

Coating Amount: 1000~1200kg/m²

NaAMPS: 2-acrylamido-2-methylpropane sulphonic acid

SPA: potassium salt of 3-sulphopropyl acrylate

DM137: ethylene/vinyl acetate copolymer

Solution A: In 20 parts of polyethylene glycol diacrylate (molecular weight 600) 6 parts of 1-hydroxy cyclohexyl phenyl ketone were dissolved.

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Measuring Object : Formulation 9 disclosed by Munro (US2002/0037270A1) as EXAMPLE 9

Weight \ Relative Humidity	50%	60%	70%	80%
Premeasurement	7.7g	7.7g	7.7g	7.7g
Postmeasurement	7.3g	7.5g	7.8g	8.3g
Changed Weight	-0.4g	-0.2g	0.1g	0.6g

Composition in parts by weight	
Formulation	Weight (g)
58%NaAMPS	50
KCl	5
SPA	16
Glycerol	20
Gum Arabic	3
DM137	3
PEG 600	10
PI/XL(Solution) Solution A	0.13
Total Weight	107.13

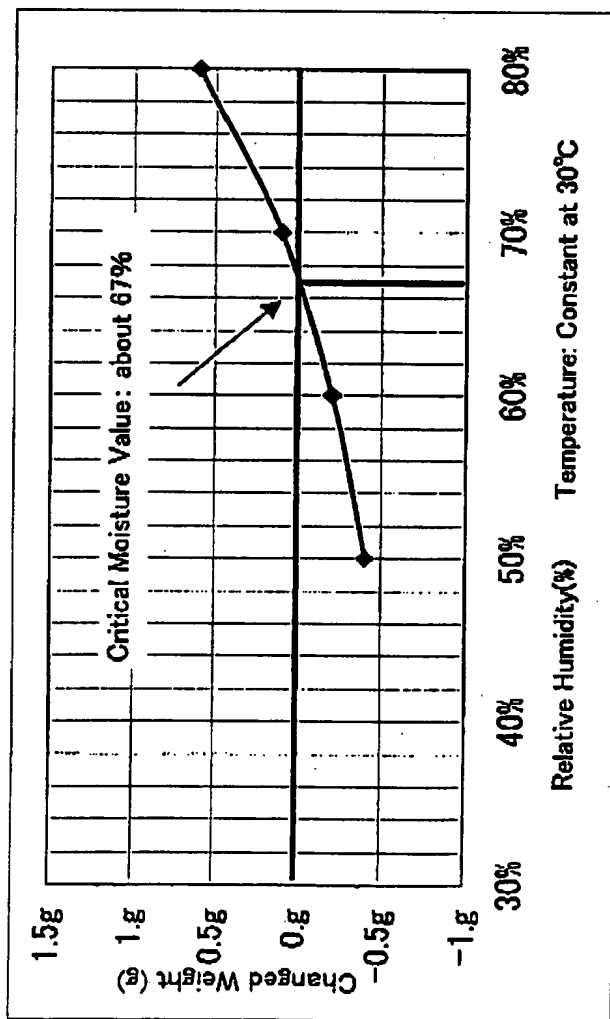
Coating Amount: 1000~1200kg/m²

NaAMPS: 2-acrylamido-2-methylpropane sulphonic acid

SPA: potassium salt of 3-sulphopropyl acrylate

DM137: ethylene/vinyl acetate copolymer

Solution A: In 20 parts of polyethylene glycol diacrylate (molecular weight 600) 6 parts of 1-hydroxy cyclohexyl phenyl keton were dissolved.

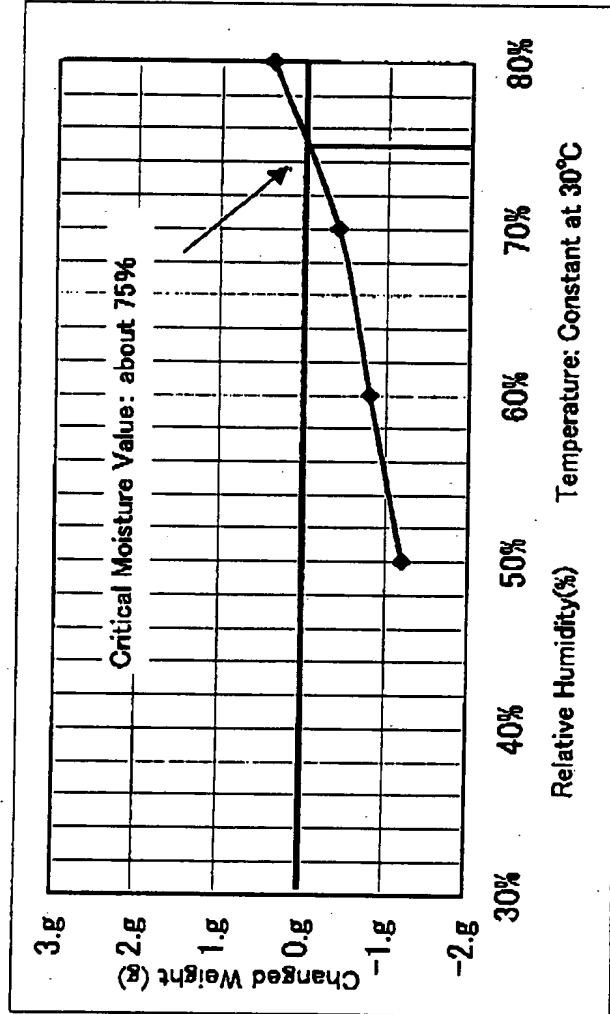


Data Sheet No. 13/21

Measuring Object : Formulation 10a disclosed by Munro (US2002/0037270A1) as EXAMPLE 10

Weight \ Relative Humidity	50%	60%	70%	80%
Premeasurement	7.7g	7.7g	7.7g	7.7g
Postmeasurement	6.5g	6.9g	7.3g	8.1g
Changed Weight	-1.2g	-0.8g	-0.4g	0.4g

Composition in parts by weight	
Formulation	Weight (g)
58%NaAMPS	44
KCl	4
SPA	20
Glycerol	20
Flexbond150	15
PI/XL(Solution) Solution G	0.13
Total Weight	103.13



Coating Amount : 1000~1200kg/m²

NaAMPS: 2-acrylamido-2-methylpropane sulphonic acid

SPA: potassium salt of 3-sulphopropyl acrylate

Flexbond150: hydrophobic vinyl acetate/dioctyl maleate copolymer emulsion

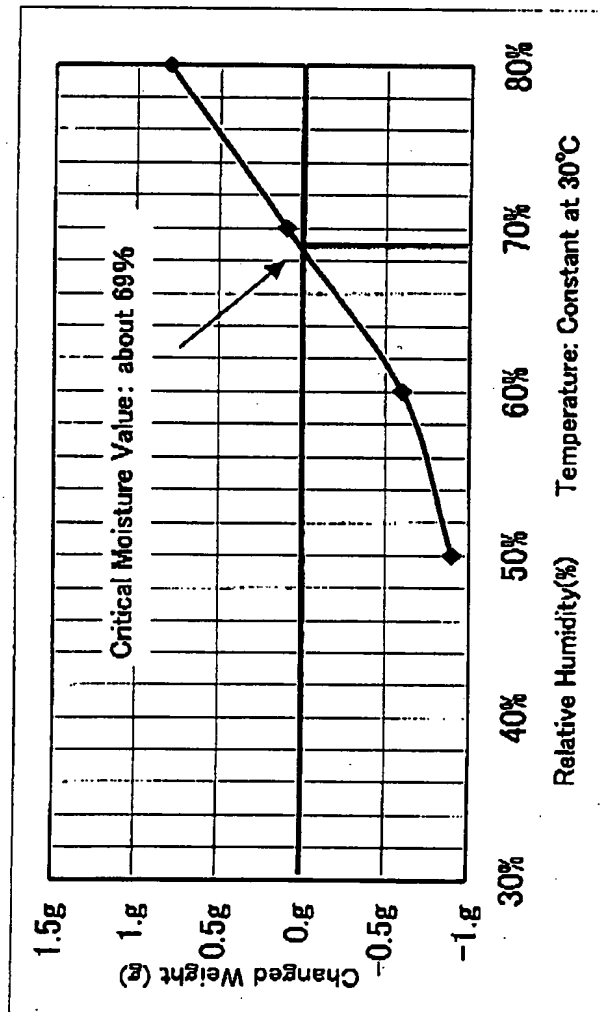
Solution G: In 20 parts of polyethylene glycol diacrylate (molecular weight 400) 6 parts of 1-hydroxy cyclohexyl phenyl keton were dissolved.

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Measuring Object : Formulation 10b disclosed by Munro (US2002/0037270A1) as EXAMPLE 10

Weight \ Relative Humidity	50%	60%	70%	80%
Premeasurement	7.7g	7.7g	7.7g	7.7g
Postmeasurement	6.8g	7.1g	7.8g	8.5g
Changed Weight	-0.9g	-0.6g	0.1g	0.8g

Composition in parts by weight	
Formulation	Weight (g)
58%NaAMPS	44
KCl	5
SPA	20
Glycerol	20
DM137	15
PEG 600	3
PI/XL(Solution) Solution G	0.13
Total Weight	107.13



Coating Amount: 1000~1200kg/m²

NaAMPS: 2-acrylamido-2-methylpropane sulphonic acid

SPA: potassium salt of 3-sulphopropyl acrylate

DM137: ethylene/vinyl acetate copolymer

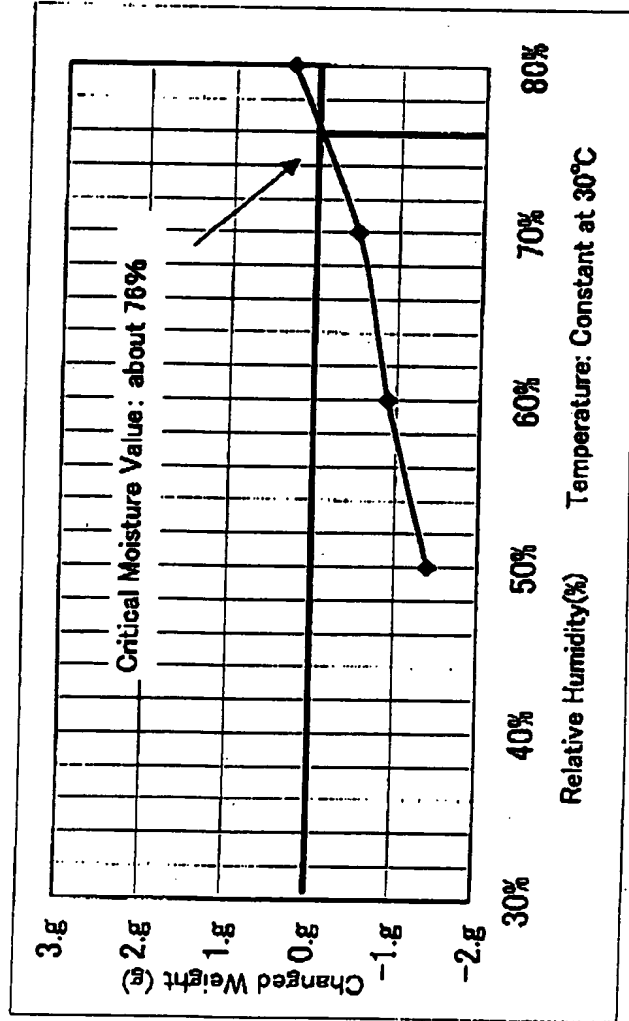
Solution G: In 20 parts of polyethylene glycol diacrylate (molecular weight 400) 6 parts of 1-hydroxy cyclohexyl phenyl ketone were dissolved.

Data Sheet No. 15/21

Measuring Object : Formulation 10c disclosed by Munro (US2002/0037270A1) as EXAMPLE 10

Weight \ Relative Humidity	50%	60%	70%	80%
Premeasurement	7.7g	7.7g	7.7g	7.7g
Postmeasurement	6.3g	6.8g	7.2g	8.8g
Changed Weight	-1.4g	-0.9g	-0.5g	0.3g

Composition in parts by weight	
Formulation	Weight (g)
58%NaAMPS	65
KCl	5
SPA	10
Glycerol	23
DM137	2
Sodium Nitrate	0.05
PI/XL(Solution) Solution G	0.15
Total Weight	105.2



Coating Amount: 1000~1200kg/m²

NaAMPS: 2-acrylamido-2-methylpropane sulphonic acid

SPA: potassium salt of 3-sulphopropyl acrylate

DM137: ethylene/vinyl acetate copolymer

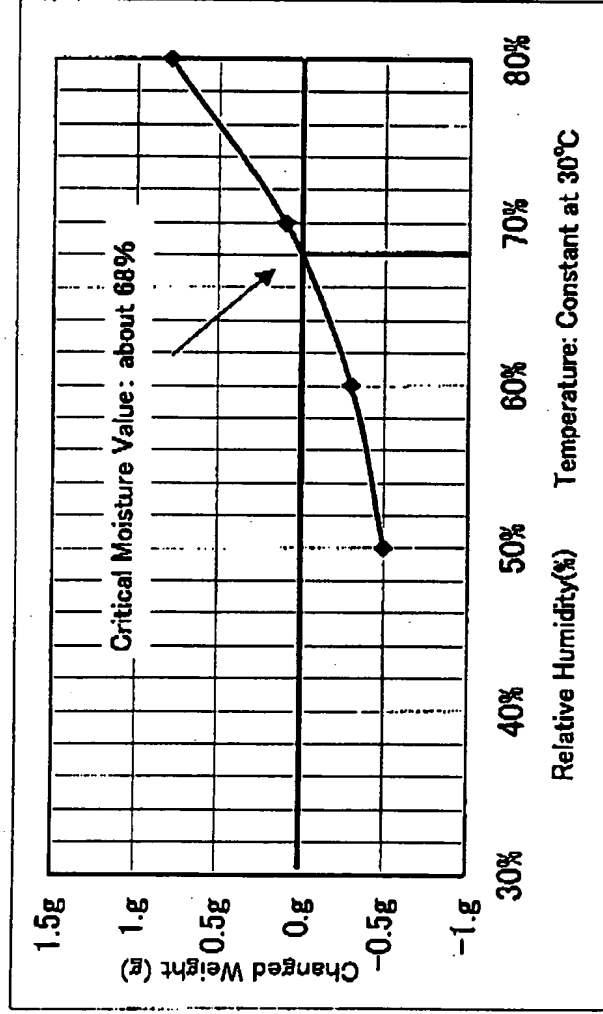
Solution G: In 20 parts of polyethylene glycol diacrylate (molecular weight 400) 8 parts of 1-hydroxy cyclohexyl phenyl ketone were dissolved.

Data Sheet No. 16/21

Measuring Object : Formulation 10d disclosed by Munro (US2002/0037270A1) as EXAMPLE 10

Weight \ Relative Humidity	50%	60%	70%	80%
Premeasurement	7.7g	7.7g	7.7g	7.7g
Postmeasurement	7.2g	7.4g	7.8g	8.5g
Changed Weight	-0.5g	-0.3g	0.1g	0.8g

Composition in parts by weight	
Formulation	Weight (g)
50%NaAMPS	35
KCl	5
SPA	25
Glycerol	20
DM137	15
PEG 600	10
PI/XI(Solution) Solution A	0.12
Total Weight	110.12



Coating Amount: 1000~1200kg/m²

NaAMPS: 2-acrylamido-2-methylpropane sulphonic acid

SPA: potassium salt of 3-sulphopropyl acrylate

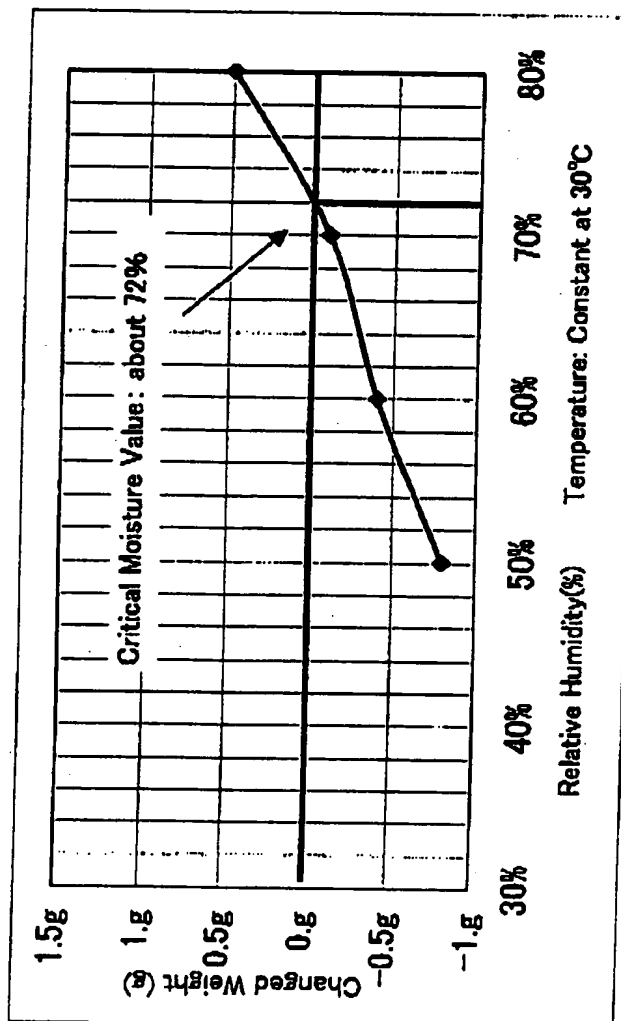
DM137: ethylene/vinyl acetate copolymer

Solution A: In 20 parts of polyethylene glycol diacrylate (molecular weight 600) 6 parts of 1-hydroxy cyclohexyl phenyl ketone were dissolved.

Data Sheet No. 17/21

Measuring Object : Formulation 10e disclosed by Munro (US2002/0037270A1) as EXAMPLE 10

Weight \ Relative Humidity	50%	60%	70%	80%
Premeasurement	7.7g	7.7g	7.7g	7.7g
Postmeasurement	6.9g	7.3g	7.6g	8.2g
Changed Weight	-0.8g	-0.4g	-0.1g	0.5g



Formulation	Composition in parts by weight
58%NaAMPS	Weight (g)
KCl	35
SPA	5
Glycerol	25
DM137	20
PEG 600	15
PI/XL(Solution) Solution A	10
Total Weight	110.13

Coating Amount: 1000~1200kg/m²

NaAMPS: 2-acrylamido-2-methylpropane sulphonic acid

SPA: potassium salt of 3-sulphopropyl acrylate

DM137: ethylene/vinyl acetate copolymer

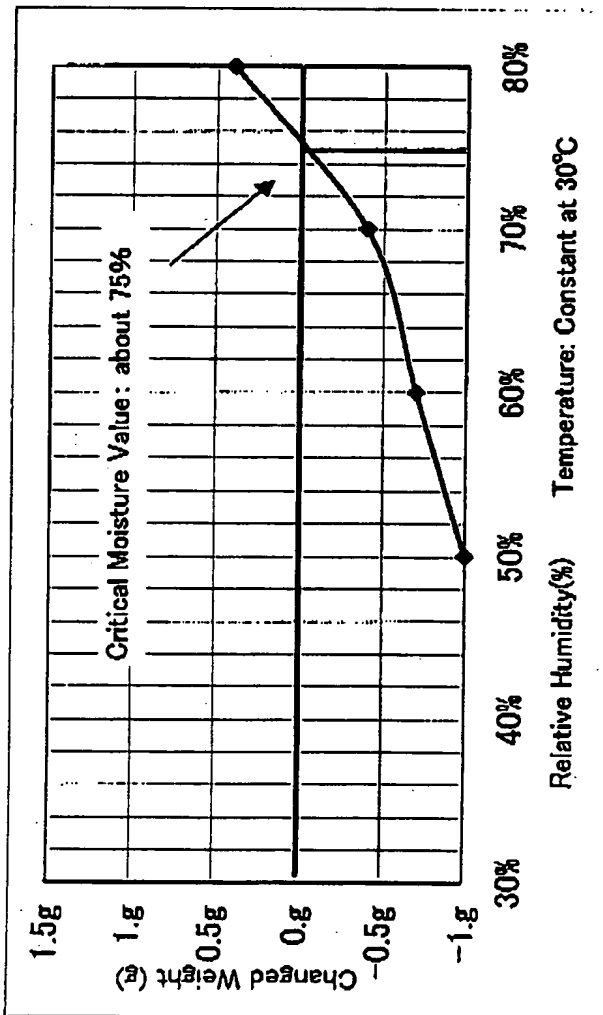
Solution A: In 20 parts of polyethylene glycol diacrylate (molecular weight 600) 8 parts of 1-hydroxy cyclohexyl phenyl keton were dissolved.

Data Sheet No. 18/21

Measuring Object : Formulation 10f disclosed by Munro (US2002/0037270A1) as EXAMPLE 10

Weight\Relative Humidity	50%	60%	70%	80%
Premeasurement	7.7g	7.7g	7.7g	7.7g
Postmeasurement	6.7g	7.g	7.3g	8.1g
Changed Weight	-1.g	-0.7g	-0.4g	0.4g

Composition in parts by weight	
Formulation	Weight (g)
58%NaAMPS	35
SPA	15
Glycerol	30
DM137	15
PEG 800	5
PI/XL(Solution) Solution A	0.15
Total Weight	100.15



Coating Amount: 1000~1200kg/m²

NaAMPS: 2-acrylamido-2-methylpropane sulphonic acid

SPA: potassium salt of 3-sulphopropyl acrylate

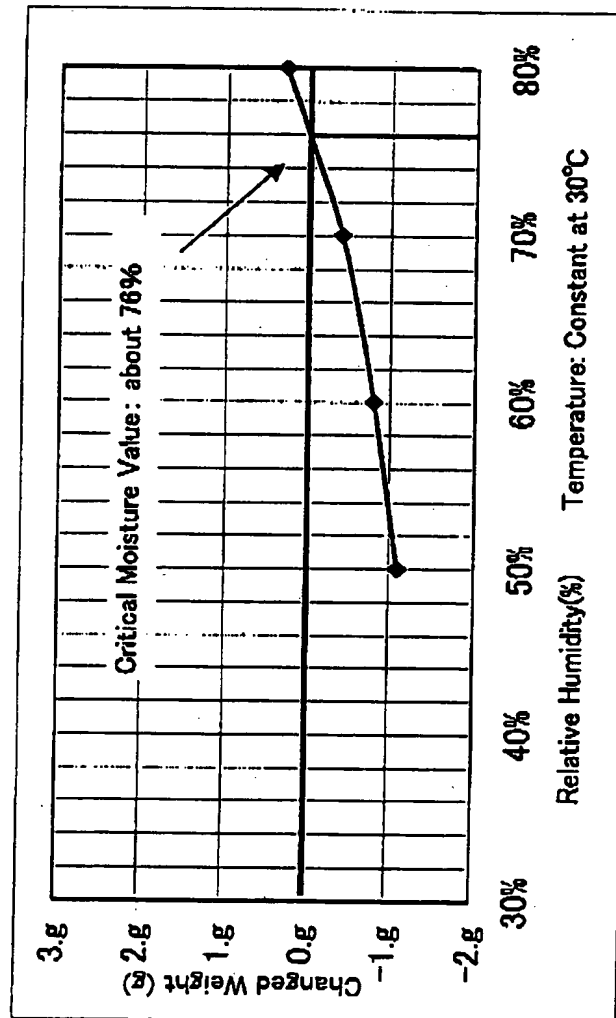
DM137: ethylene/vinyl acetate copolymer

Solution A: In 20 parts of polyethylene glycol diacrylate (molecular weight 600) 6 parts of 1-hydroxy cyclohexyl phenyl keton were dissolved.

Data Sheet No. 19/21

Measuring Object : Formulation 10g disclosed by Munro (US2002/0037270A1) as EXAMPLE 10

Weight \ Relative Humidity	50%	60%	70%	80%
Premeasurement	7.7g	7.7g	7.7g	7.7g
Postmeasurement	6.6g	6.9g	7.3g	8.g
Changed Weight	-1.1g	-0.8g	-0.4g	0.3g



Composition in parts by weight	
Formulation	Weight (g)
58%NaAMPS	37
SPA	18
Glycerol	30
DM137	10
PEG 800	5
PI/XL(Solution) Solution A	0.15
Total Weight	100.15

Coating Amount: 1000~1200kg/m²

NaAMPS: 2-acrylamido-2-methylpropane sulphonic acid

SPA: potassium salt of 3-sulphopropyl acrylate

DM137: ethylene/vinyl acetate copolymer

Solution A: In 20 parts of polyethylene glycol diacrylate (molecular weight 600) 6 parts of 1-hydroxy cyclohexyl phenyl keton were dissolved.

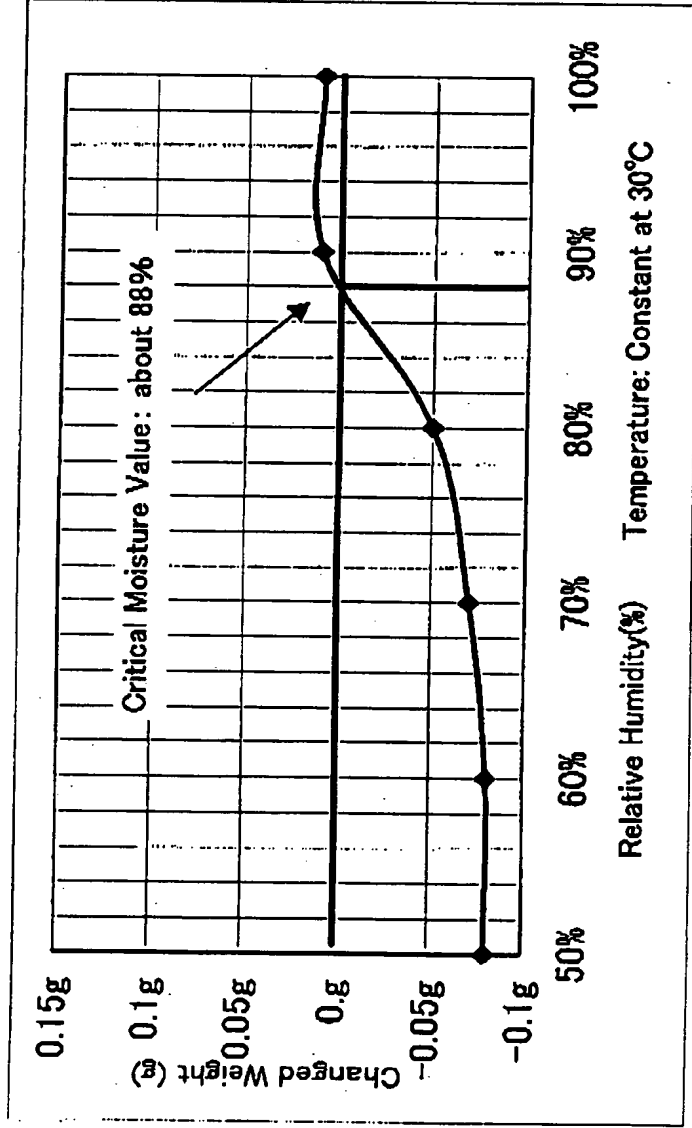
Data Sheet No. 20/21

Measuring Object : Formulation disclosed by Usui (US5,046,479) as PREPARATION EXAMPLE 1

Weight \ Relative Humidity	50%	60%	70%	80%	90%	100%
Premeasurement	10.g	10.g	10.g	10.g	10.g	10.g
Postmeasurement	9.92g	9.92g	9.93g	9.95g	10.01g	10.01g
Changed Weight	-0.08g	-0.08g	-0.07g	-0.05g	0.01g	0.01g

Composition in parts by weight	
Formulation	Weight (g)
Iron Powder	0
Water	20
Wood Flour	5.5
Vermiculite	5
Activated Carbon	4.5
Salt	5
Total Weight	40

Amount: 10.00g/bag (7cm x 10cm)



Data Sheet No. 21/21

Measuring Object : Formulation disclosed by Usui (US5,046,479) as PREPARATION EXAMPLE 3

Weight \ Relative Humidity	50%	60%	70%	80%	90%	100%
Premeasurement	10.g	10.g	10.g	10.g	10.g	10.g
Postmeasurement	9.91g	9.92g	9.93g	9.94g	9.98g	10.03g
Changed Weight	-0.09g	-0.08g	-0.07g	-0.06g	-0.02g	0.03g

Composition in parts by weight	
Formulation	Weight (g)
Iron Powder	0
Water	21
Vermiculite	5
Wood Flour	6
Activated Carbon	5
Salt	5
Total Weight	42

Amount: 10.00g/bag (7cm x 10cm)

